

Unit Planning Guide: Grade 8 Unit 3 of 6

Unit Title: Real Numbers	Pacing (Duration of Unit): 20 days (4 weeks)
Grade: 8	Buffer Day(s): 5 days

Desired Results

Transfer Goals

Students will be able to independently use their learning to:

- Make sense of problems and persevere in solving them.
- **Reason abstractly and quantitatively.**
- Construct viable arguments and critique the reasoning of others.
- **Model with mathematics.**
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- **Look for and express regularity in repeated reasoning.**

Established Goals (2011 MA Curriculum Frameworks Standards Incorporating the Common Core State Standards)

Standards (Priority Standards in bold):

8.NS.1: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion that repeats eventually into a rational number.

8.NS.2: Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).

8.EE.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions.

8.EE.2: Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes.

Know that $\sqrt{2}$ is irrational.

8.EE.3: Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.

8.EE.4: Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large

WIDA for English Language Learners

Standard 1: ELLs **communicate** for **Social** and **Instructional** purposes within the school setting

Standard 3: ELLs **communicate** information, ideas and concepts necessary for academic success in the content area of **Mathematics**

In the lesson planning stage, teachers will need to differentiate lessons for ELLs. In order to accomplish this they will need: 1.) this curriculum map, 2.) a list of their ELLs and their proficiency levels, and 3.) appropriate language function expectations and scaffolds or supports.

or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

8.G.6: Explain a proof of the Pythagorean Theorem and its converse.

8.G.7: Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

8.G.8: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Meaning (*Mostly assessed through Performance Tasks/Assessments)

Big Ideas:

- Connecting linear and quadratic measures using the Pythagorean Theorem.

Essential Questions: (Questions which frame ongoing and important inquiries about the big ideas. They are written for students and used in daily instruction to help engage students in meaningful thinking.)

- How is the Pythagorean Theorem used in the real world?
- How do representing very large numbers and very small numbers using scientific notation help us in the real world?

Acquisition (*Mostly assessed through traditional summative assessments)

Knowledge: Key basic concepts, facts, and key terms (written in phrases) students should be able to recall independently.

Students will know ...

- Square numbers and their roots
- The difference between rational and irrational numbers
- Cube numbers and their roots
- The Real Number System (Whole, Integers, Rational and Irrational)
- The Pythagorean Theorem and its converse
- The properties of integer exponents
- Numbers can be expressed in powers of ten

Key Academic Vocabulary

Square root

Cube root

Irrational Numbers

Scientific Notation

Pythagorean Theorem

Converse

Hypotenuse

Legs (sides of a triangle)

Skills: The discrete skills and process students should be able to use independently (Bloom's Level of Learning should be noted in parentheses.)

Students will be skilled at:

- Evaluating small perfect square and cube roots
- Using square root and cube root symbols to represent solutions to equations
- Converting repeating decimals to fractions
- Approximating an irrational number and locating it on a number line
- Ordering Real Numbers
- Converting large and small numbers into scientific notation
- Perform operations with numbers expressed in scientific notation
- Applying the Pythagorean Theorem to solve real world problems
- Applying the properties of integer exponents to generate equivalent expressions
- Calculate the distance between two points in a coordinate